

REMARKS

Claims 1-18 are amended. Upon entry of the amendment, claims 1-18 are pending in the present application.

Claims 1, 2, 3, 7, and 8 stand rejected under 35 USC § 102(b) as being anticipated by either Dias (US 5,488,955) or Hansen (US 6,624,539). Claims 4, 6, 9-13, and 15-18 stand rejected under 35 USC § 102(b) as being anticipated by Hansen (US 6,624,539).

As recited in amended claim 1, the bonding apparatus of the present invention is comprised of "a bonding tool coupled to an ultrasonic transducer, said transducer comprising: a giant magnetostrictive element, a fastener for holding the giant magnetostrictive element under mechanical pressure, a first field generator for providing a magnetic bias field, a second field generator for providing a magnetic drive field, and a magnetic circuit for channelling the magnetic fields in the giant magnetostrictive element."

Amended claim 10 recites, "A bonding apparatus for a wire bonding machine comprising: a horn having a bonding tool at a smaller end and a mounting collar at an opposite end, and an ultrasonic transducer coupled to the horn and comprising a giant magnetostrictive element, a fastener for holding the giant magnetostrictive element under mechanical pressure, a first field generator for providing a magnetic bias field, a second field generator for providing a magnetic drive field, and a magnetic circuit for channelling the magnetic fields in the giant magnetostrictive element."

As described in the specification, traditional piezoelectric ultrasonic transducers suffer from accelerated aging and failure rate when used in high-powered applications. As recited in the amended claims, the ultrasonic transducer of the present invention employs rare-earth alloy based materials to achieve improved power-handling capabilities, efficiency and reliability in wire bonding applications. Moreover, Applicant's

configuration of a horn having a bonding tool at the smaller end and a mounting collar on the opposite end avoids energy loss and degradation of the bonding performance.

Applicant respectfully disagrees with the Examiner's assertion that Dias and/or Hansen anticipate the present invention because neither reference discloses, teaches or suggests all of the elements as claimed. As discussed below, both of the cited references lack the disclosure of (1) a wire bonding tool coupled to an ultrasonic transducer; (2) a horn having a bonding tool at a smaller end and a mounting collar at an opposite end; and (3) a magnetostrictive element comprised of two rare-earth elements separated by a passive polymer. Because the references do not teach every element of the present invention as claimed, the rejection is improper.

Dias discloses an intraoperative probe for acoustic medical imaging and Hansen discloses a high power transducer for general-purpose applications. Neither reference specifically discloses the current invention, which is an ultrasonic transducer for a microelectronic wire bonding apparatus. The claims have been amended to more specifically reflect this particular application. A close reading of the cited references reveals that neither reference discloses a wire bonding apparatus having a bonding tool coupled to an ultrasonic transducer. Nor do the references disclose a horn having a bonding tool at a smaller end and a mounting collar at an opposite end.

As discussed above, amended claim 1 requires a bonding tool coupled to an ultrasonic transducer and claim 10 requires a horn having a bonding tool at a smaller end and a mounting collar at an opposite end. Because these features are neither disclosed, taught, nor suggested by the references, amended claims 1 and 10 cannot be properly rejected as anticipated or obvious. Furthermore, claims 2-9 depend on claim 1 and are patentable for at least those reasons set forth in support of claim 1. Claims 11-18 depend from claim 10 and are patentable for at least the same reasons set forth in support of claim 10. For these reasons, Applicant respectfully requests that the rejection be withdrawn.

Claims 5 and 14 stand rejected under 35 USC § 103(a) as being obvious in light of Hansen or Dias. The Examiner alleges that the references disclose the claimed structure but do not specifically teach a magnetostrictive material comprised of two rare based alloy parts separated by a passive polymer. As such, the prime facie case of obviousness has not been established and the Examiner's rejection should be withdrawn.

As required by MPEP 2143 *et seq.* to establish a prima facie case of obviousness, three basic criteria must be met:

- (1) There must be some suggestion or motivation to modify or combine the teachings of the references;
- (2) There must be some expectation of success;
- (3) The references when combined must teach or suggest all the claim limitations.

As discussed above, neither Hansen nor Dias discloses, teaches, or suggests all of the elements of the invention as claimed. Additionally, the Examiner admits that the references do not specifically disclose the magnetostrictive material comprised of two rare based alloy parts separated by a passive polymer as recited in the claims. Moreover, neither reference suggests the desirability or provides the motivation to modify the teachings to achieve the present invention as claimed. Because neither reference teaches all of the features of the present invention, the present invention is not made obvious and the Examiner's rejection must fall.

Despite the Examiner's contention that it would have been obvious to one of ordinary skill in the art to select the magnetostrictive material comprised of two rare based alloy parts separated by a passive polymer as recited in the claims, the Examiner provides no technical reasoning or explanation. The fact that reference teachings can be combined or modified does not render the resultant combination obvious unless the

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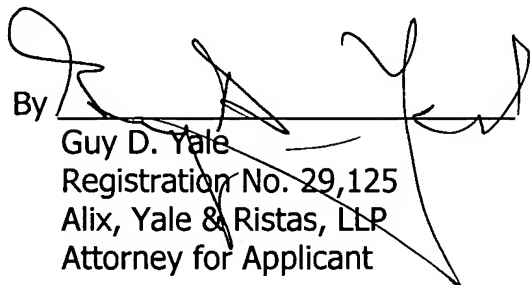
prior art also suggests the desirability of the combination. MPEP 2143.01/*In re Mills*, 916 F.2d 680 (Fed. Cir. 1990).

Rather than making a proper obviousness rejection, the Examiner has resorted to impermissible hindsight since the only route to discover the missing elements is to use Applicant's invention as a blueprint. Because the combination of references fail to teach, disclose or suggest all of the elements of the present invention as claimed and there is no motivation to combine the reference invention to arrive at the invention of the present application, the Examiner's obviousness rejection should be withdrawn.

For all the foregoing reasons, allowance of claims 1-18 is respectfully requested.

Respectfully submitted,

SIU WING OR et al

By 
Guy D. Yale
Registration No. 29,125
Alix, Yale & Ristas, LLP
Attorney for Applicant

Date: November 18, 2005
750 Main Street
Hartford, CT 06103-2721
(860) 527-9211
Our Ref: MCHK/149/US
GDY/RAN/io

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